

# Health of King County 2006

## ***Chapter 8: Communicable Disease***

### **HIV/AIDS**

### **Sexually Transmitted Diseases**

### **Tuberculosis**

### **Childhood Immunization**

### **Adult Immunization for Pneumococcal Disease and Influenza**

### **Vaccine Preventable Diseases**

### **Hepatitis C**

### **Enteric, Food and Waterborne Diseases**

### **Vectorborne and other Zoonotic Diseases**

### **Emerging Infectious Diseases**

# Introduction

The importance of communicable (infectious) diseases as a cause of morbidity and mortality in the US declined dramatically during the past 100 years with the establishment of sanitary water supplies and sewage systems, and with the advent of the antibiotic era. However, the past 25 years have seen the emergence of new infectious diseases and the re-emergence of infections that were thought to be declining. Although HIV/AIDS is notable among the emerging infectious diseases, a host of other infectious diseases have been recently identified, such as *E. coli* O157:H7 infection, hantavirus pulmonary syndrome, Lyme disease, SARS, and avian influenza. Tuberculosis, particularly multi-drug resistant tuberculosis has gained attention in recent years as an important re-emerging pathogen. However antimicrobial-resistant strains of other pathogens are also emerging, such as methicillin-resistant *Staphylococcal aureus* (MRSA) and vancomycin-resistant enterococcus (VRE). In addition, the burden of established pathogens such as hepatitis C is increasing as the infected population ages and suffers the consequences of chronic infection.

In this chapter, we examine a selection of communicable diseases that either cause ongoing mortality or morbidity, have the potential to become epidemic, or are preventable with vaccination. Diseases and data presented in this chapter are compiled from the report "Public Health-Seattle & King County: Communicable Disease Summary 2003 and 2004". For more detailed information, readers can view the entire report at <http://www.metrokc.gov/health/prevcont/index.htm>.

## Summary of Communicable Disease Incidence or Death in King County, WA State, and U.S.\*

Disease	King 2004 <sup>1</sup>		WA 2004 <sup>2,3</sup>		U.S. <sup>4,5</sup>	
	Rate	N	Rate	N	Rate	N
HIV/AIDS Death (age-adjusted rate, 2003)	4.7	89	2.4	146	4.7	13544
STDs						
-Chlamydia	305.1	5428	285.9	17635	319.6	929462
-Gonorrhea	72.3	1286	45.6	2810	113.5	330132
-Syphilis (early stage)**	9.3	166	3.3	201	2.7	7980
Tuberculosis	7.4	133	3.9	244	5.0	14874
Hepatitis A	0.8	14	1.1	69	2.6	7653
Hepatitis B, acute	1.3	23	1.0	64	2.5	7526
Hepatitis C, acute	0.6	10	0.4	23	0.4	1102
HIB	0.1	2	0.0	3	0.7	2013
Measles	0.3	6	0.1	7	0.0	56
Meningococcal Disease	1.0	18	0.7	42	0.6	1756
Mumps	0.0	1	0.0	2	0.1	231
Pertussis	11.2	201	13.7	842	3.9	11647
Influenza/pneumonia Death (age-adjusted rate, 2003)	20.0	334	18.5	1082	22.0	65163
Enteric Diseases						
-Campylobacteriosis	14.8	264	14.0	861		NA
-E. Coli O157:H7	2.3	42	2.5	153	0.9	2671
-Giardiasis	7.0	126	7.2	444	6.7	19709
-Salmonellosis	13.1	234	10.7	660	14.8	43657
-Shigellosis	3.5	63	2.2	133	8.0	23581

\*Note that King County incidence cases are based on day of report; WA State cases are based on date of onset; and U.S. cases from MMWR are based on date reported to the CDC. The U.S. data are for 2004 on STDs and for 2003 on the other communicable diseases.

\*\*Early stage includes primary, secondary, and early latent cases. The U.S. data only include primary and secondary cases.

## References

- Public Health – Seattle & King County. Communicable Disease Summary 2003 and 2004. [www.metrokc.gov/health/prevcont/index.htm](http://www.metrokc.gov/health/prevcont/index.htm).
- Washington State Department of Health. Washington State Communicable Disease Report 2004. [www.doh.wa.gov/Notify/other/2004cdr/cdr2004.pdf](http://www.doh.wa.gov/Notify/other/2004cdr/cdr2004.pdf).
- Washington State Department of Health. Washington State 2004 Sexually Transmitted Disease Morbidity. [www.doh.wa.gov/cfh/STD/morbidity.htm](http://www.doh.wa.gov/cfh/STD/morbidity.htm)
- CDC. Summary of Notifiable Disease – United States, 2003. MMWR. April 22, 2005/52(54);1-85.
- CDC. Trends in Reportable Sexually Transmitted Diseases in the United States, 2004. National Surveillance data for Chlamydia, Gonorrhea, and Syphilis. [www.cdc.gov/std/stats/trends2004.htm](http://www.cdc.gov/std/stats/trends2004.htm)

# HIV/AIDS

Although HIV/AIDS is still a disease that primarily affects men who have sex with men, it is gradually spreading to other populations.

Because an estimated 25% of infected people are unaware of their infection, local program goals include increasing the number of infected people who are aware of their infection and who are getting high quality care, and decrease the prevalence of high risk behaviors.

As new antiretroviral treatment has grown more effective and new infections continue to occur, the prevalence of HIV is increasing at about 250 to 300 new cases per year.

Effective treatment has decreased mortality substantially in recent years. The last Health of King County reported that HIV was the 8th leading cause of death in 1996, but in 2003 it was the 14th leading cause.

The magnitude of disparities in incidence, prevalence and mortality in high-risk communities is among the largest of any health outcome.

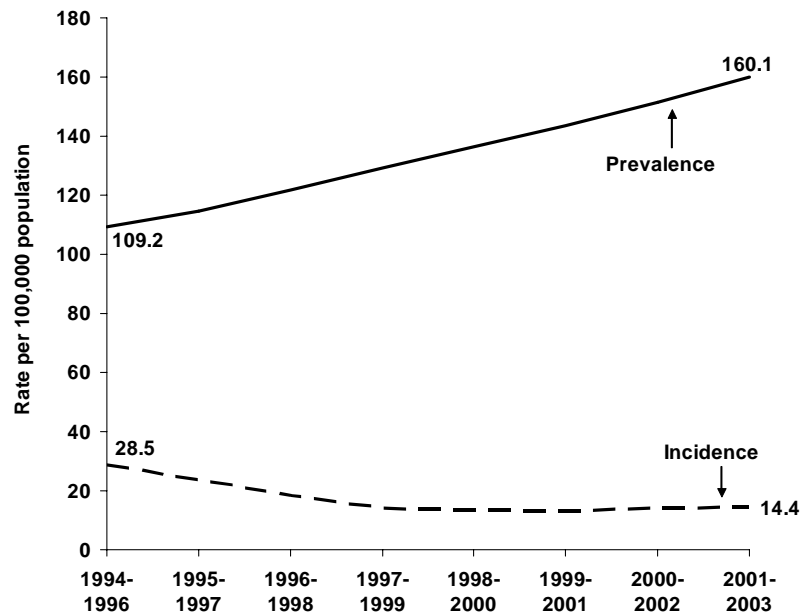
This section is a summary of an important and complex topic. For more comprehensive data on HIV/AIDS in King County, visit the HIV/AIDS Surveillance website at <http://www.metrokc.gov/health/apu/epi/index.htm> and [Public Health Core Indicators for Seattle & King County](http://www.metrokc.gov/health/reports/CoreIndicators/index.htm) at <http://www.metrokc.gov/health/reports/CoreIndicators/index.htm>.

## King County and Regions

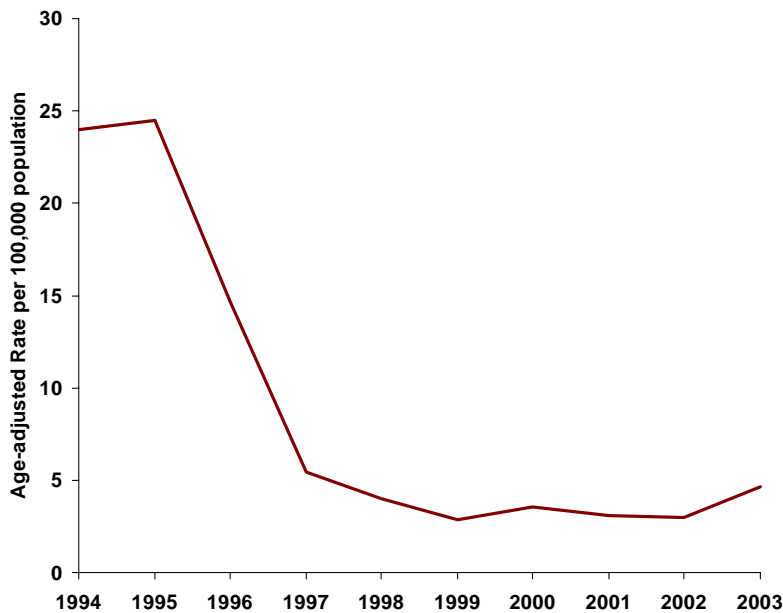
### Morbidity

- The rate of new cases of AIDS has decreased over the last 10 years, although the decrease has slowed or ended in the last five years. In 2003, 280 incident cases were reported, for a rate of 15.7 per 100,000.
- HIV incidence rates also fell from 1992-1994 to 1997-1999, but have flattened out in the last five years. In 2004, 363 new cases of HIV were reported, for a rate of 20.4 per 100,000 (data not shown).
- During this time period, HIV prevalence and AIDS prevalence has increased steadily. In 2004, HIV prevalence was 319.1 per 100,000 (5,706 cases) and AIDS prevalence stood at 178.1 per 100,000 (3,185 cases) (data not shown).
- From 1994 to 2003, AIDS and HIV prevalence increased in all regions of the county (for more data, see [Public Health Core Indicators for King County](http://www.metrokc.gov/health/reports/CoreIndicators/index.htm)).

**AIDS Incidence and Prevalence Rates,  
King County, 3-Year Rolling Averages, 1994-2003**



Data Source: Public Health - Seattle & King County, HIV/AIDS Registry Data, Prevention Division  
Produced by: Epidemiology, Planning and Evaluation Unit

**HIV Mortality, King County, 1994-2003**

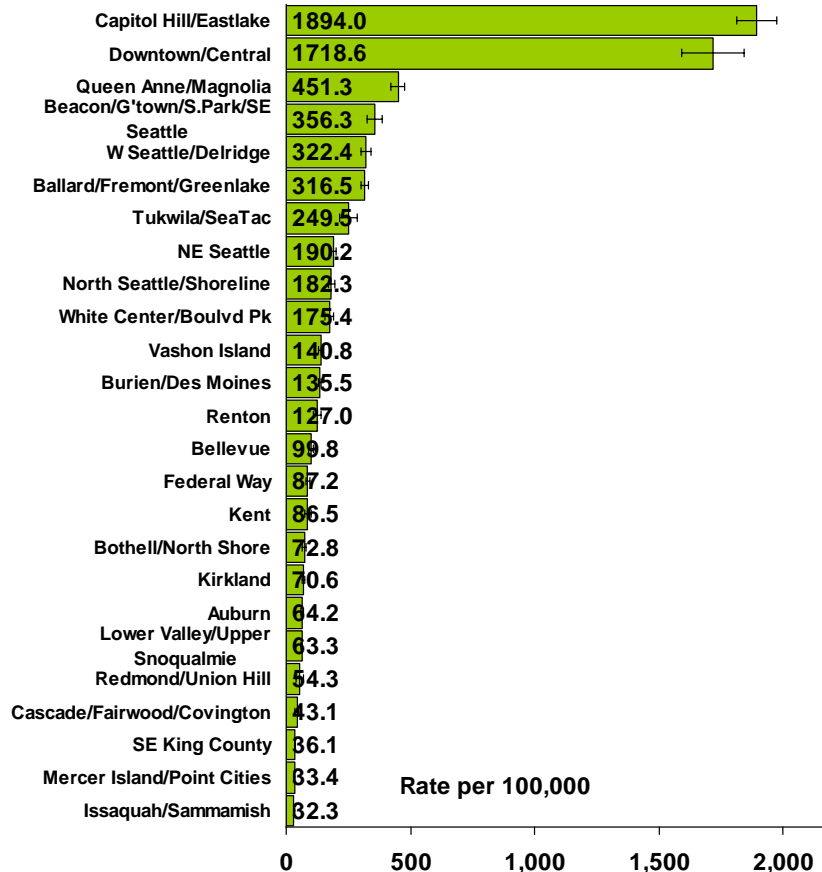
Data Source: Washington State Department of Health, Center for Health Statistics, Death Certificates.  
Produced By: Public Health - Seattle & King County, Epidemiology, Planning & Evaluation

**Mortality**

- In 2003, 89 people died of HIV, for a rate of 4.7 per 100,000. The last Health of King County reported that HIV was the 8th leading cause of death in 1996, but in 2003 it was the 14th leading cause.
- However, the overall downward trend of HIV deaths ended in 1999 (2.9 deaths per 100,000). Although the number of deaths and death rates have varied somewhat between 1999 and 2003, they have generally remained at this lower level.
- The decrease in mortality was seen in Seattle and South County. Other regions had so few deaths that trends could not be reliably analyzed.

**Patterns by Health Planning Area**

- HIV and AIDS incidence and prevalence occurs in every King County Health Planning area, but high numbers of cases and rates are overwhelmingly concentrated in the Capitol Hill/Eastlake and Downtown/Central HPAs. For instance, these two HPAs have HIV prevalence rates more than three times higher than the next highest HPA, Queen Anne/Magnolia.
- This pattern in mortality rates is also seen in mortality from HIV. The rate is highest in Downtown/First Hill (29.7 per 100,000). Health Planning Areas located in East County, and Vashon Island generally show fewer than 5 deaths a year, below the minimum number of events for calculating valid rates.

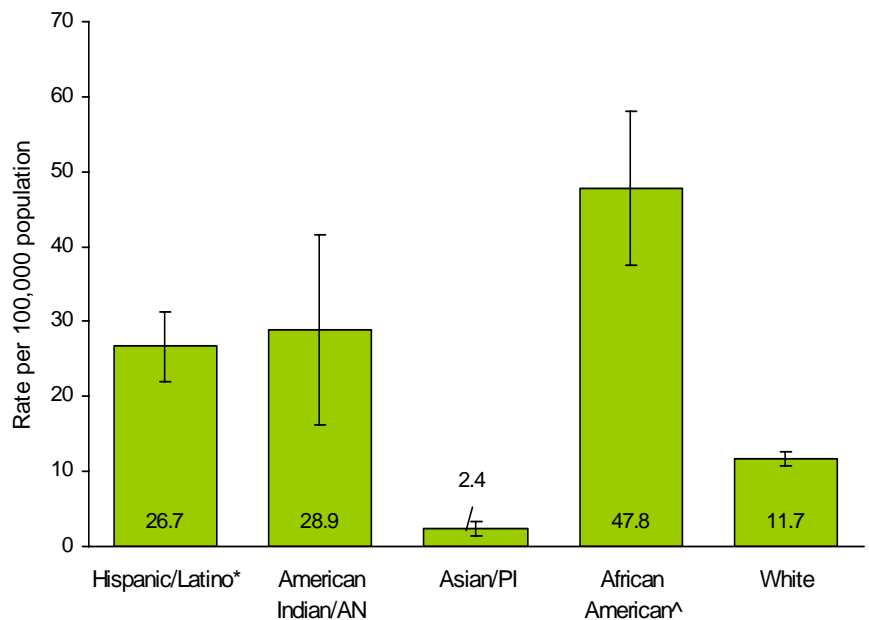
**HIV Prevalence by Health Planning Area, King County, 5-year Average, 1999-2003**

Produced by: Epidemiology, Planning & Evaluation, Public Health - Seattle & King County

## Focus on Disparities

- There are substantial disparities in the incidence, prevalence and mortality from HIV/AIDS. Higher risk is seen in men who have sex with men, people who live in high poverty neighborhoods, and African Americans, Hispanic/Latinos, and American Indian/Alaska Natives. Below are two examples of the widest disparities.
- AIDS incidence in African Americans is four times the white rate, and in American Indian/Alaska Natives and Hispanic/Latinos the rate is over twice that of whites. The rate seen in Asian/Pacific Islanders is less than one-quarter of the rate in whites.
- African Americans include two distinct populations: U.S.-born and foreign-born persons. The U.S.-born represent 61% of recent cases among African Americans; 75% are men who have sex with men or injection

**AIDS Incidence Rates By Race/Ethnicity,\*\*  
King County, 5-year Average, 1999 - 2003**

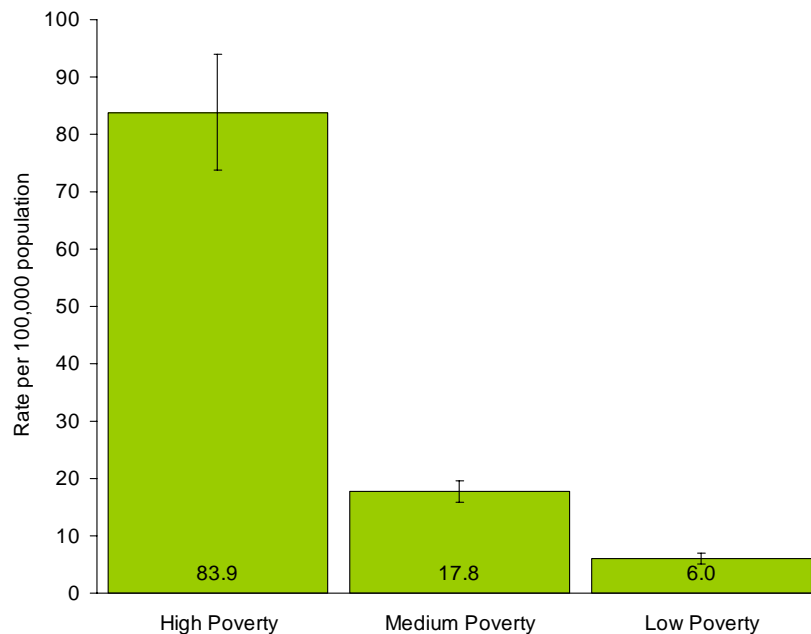


\*The category "Hispanic/Latino" is presented as a race for HIV/AIDS data. All other races are non-Hispanic.

^The category African American includes both U.S.-born and foreign-born persons.

Data Source: Public Health - Seattle & King County, HIV/AIDS Registry Data, Prevention Division  
Produced by: Epidemiology, Planning and Evaluation Unit

**HIV Incidence Rates by Neighborhood Poverty Level,  
King County, 1999-2003 Combined**



Data Source: Public Health - Seattle & King County, HIV/AIDS Registry data, Prevention Division  
Produced by: Public Health - Seattle & King County, Epidemiology, Planning & Evaluation

drug users. The foreign-born represent 39% of recent cases among African Americans; 96% were exposed to HIV heterosexually or through undetermined sources. Rates among foreign-born African Americans are 6 to 12 times higher than for whites, while rates among U.S.-born African Americans are 3-4 times higher.

- In 1999-2003, new cases of HIV occurred in high-poverty neighborhoods at a rate of 83.9 per 100,000. In low-poverty neighborhoods, HIV incidence was 6.0 per 100,000, a more than 13-fold difference.

# Sexually Transmitted Diseases (STDs)

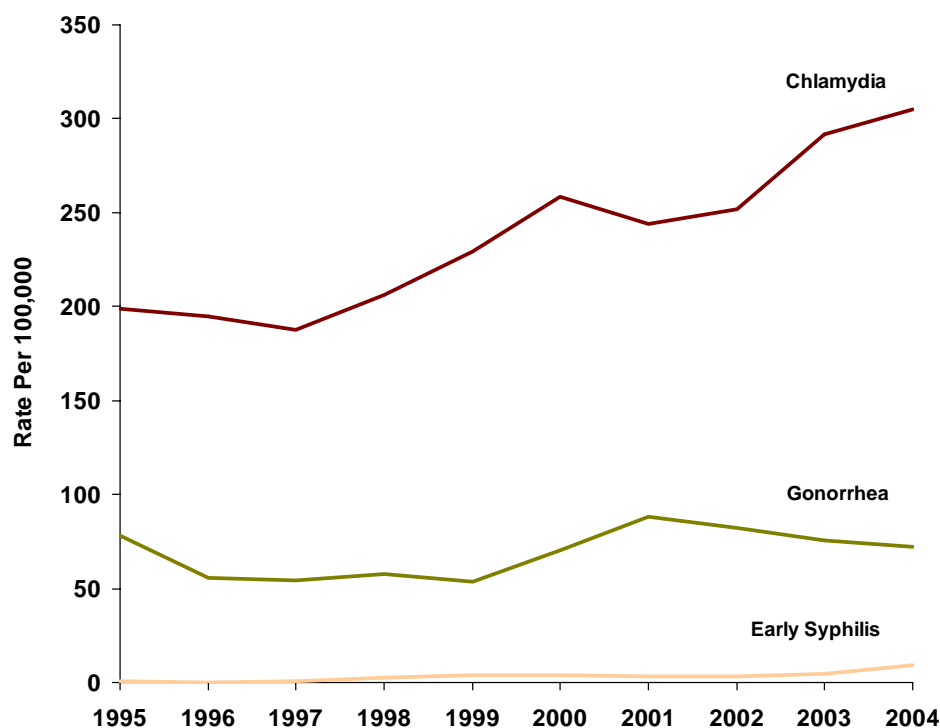
**Sexually transmitted diseases (STDs) are caused by a variety of bacteria, viruses, and other organisms. Bacterial STDs, such as chlamydia, gonorrhea and syphilis, can be cured with antibiotics. STDs caused by viruses, such as genital herpes, human papillomavirus, hepatitis B, and HIV infection cannot be cured, but most can be treated to relieve symptoms and help prevent complications. If untreated, STDs can have consequences ranging from mild brief illness to serious complications such as infertility, tubal pregnancy, cancer, stroke, and death. Many STDs can cause serious health problems, including death, in infants born to infected mothers.**

**In this section, we summarize the data for chlamydia, gonorrhea, and syphilis. Other diseases that can be transmitted through unprotected sex, including HIV infection, hepatitis B and hepatitis C, are presented in other sections of this chapter.**

## Chlamydia

- Chlamydia is the most commonly reported infection in the United States. It is transmitted through unprotected sex and can be transmitted from mother to baby during childbirth.
- Chlamydial infection can result in pelvic inflammatory disease (PID), which can cause ectopic pregnancy and female infertility.
- Chlamydial infection is often asymptomatic. Therefore, rates based on reported cases almost certainly underestimate the true incidence of the disease.
- In 2004, 5,428 cases of chlamydial infection were reported among King County residents, including 3,647 cases among women.
- Between 1995 and 2004, the incidence rate of chlamydia has been increasing.
- The incidence rate was highest among females age 15-20 (2363.9 cases per 100,000) and among males age 20-24 (814.9 cases per 100,000).

**Incidence Rates for Chlamydia, Gonorrhea, and Early Syphilis in King County, 1995-2004**



Data Source: Washington State Department of Health, STD/TB Services  
Produced by: PublicHealth - Seattle & King County, Epidemiology, Planning and Evaluation

## **Gonorrhea**

- Gonococcal infection if left untreated, may also lead to PID, subsequently cause infertility, ectopic pregnancy, and/or chronic pelvic pain. An infant who contracts gonorrhea from her mother during delivery may develop gonococcal conjunctivitis, which may lead to blindness if untreated.
- Gonorrhea is often experienced without symptoms. Reported cases are believed to reflect about half the true total.
- In 2004, 1,286 cases were reported among King County residents, including 414 cases of women.
- Men who have sex with men (MSM) have a higher incidence rate than heterosexual men or women.

## **Syphilis**

- Syphilis is most often transmitted through unprotected sex and can be transmitted from mother to baby during pregnancy.
- King County experienced a sharp increase in early syphilis cases (including primary, secondary, and early latent cases) in 2004, with 166 reported cases, compared to 84 cases in 2003.
- Between 1995 and 2004, the incidence rate of early syphilis increased significantly.
- Of the 166 cases in 2004, 140 (84%) were among MSM. Since 1997, King County has experienced an epidemic of syphilis among MSM. It is estimated that the incidence of early syphilis was 324.5 per 100,000 among MSM in 2004, compared to 1.5 per 100,000 among heterosexuals. More than half (56%) of the 2004 early syphilis cases in MSM were also HIV positive.
- King County also experienced an outbreak of early syphilis among heterosexuals in 2004 with 26 cases, compared to 5 cases in 2003. Most of these cases reported engaging in commercial sex work, sex with commercial sex workers, and /or drug use.

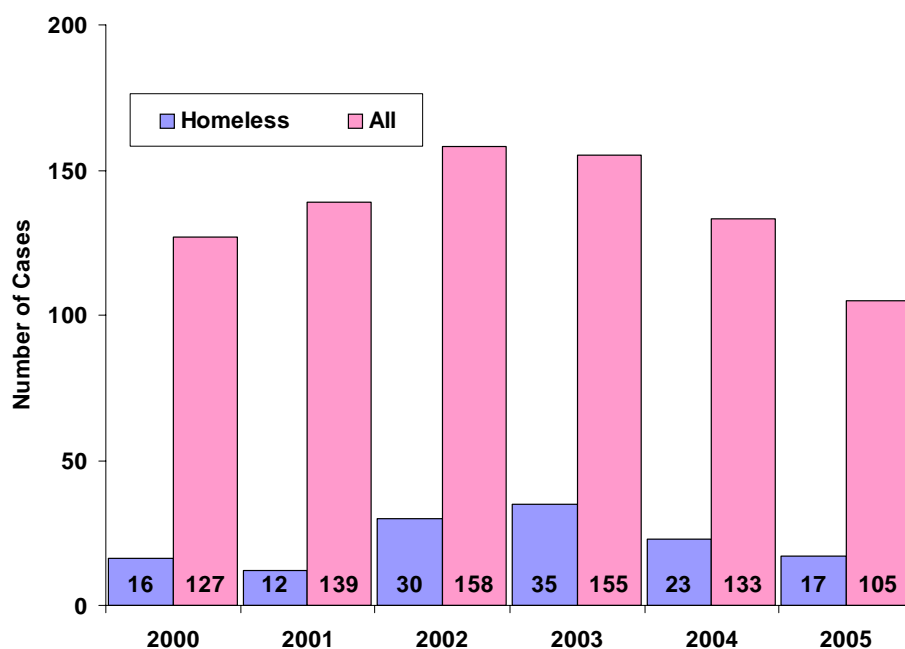
# Tuberculosis

**Tuberculosis (TB)** is spread from person to person through airborne exposure. TB bacteria can be released into the air when a person with active TB disease coughs, sneezes, sings, etc. After TB exposure, some people may acquire dormant, latent TB infection. These individuals are not contagious and do not have symptoms. However, those with latent TB infection have a 10% risk of developing active TB disease; 5% within the first 2 years after acquisition and an additional 5% over the rest of their lifetime.

Active TB disease usually affects the lungs, but can affect other parts of the body such as the brain, kidney or spine. Affected individuals may have symptoms of weight loss, cough, night sweat, fever or fatigue.

- In 2005, there were 127 new TB cases diagnosed in King County.
- Between 2000 and 2005, the number of cases per year ranged from 127 to 158.
- TB incidence rates in Seattle-King County remain higher than rates in the rest of the state and the national average. It is estimated that there are over 100,000 people with latent TB infection in King County.
- Twenty-three cases (18% of all TB cases) were homeless in 2005. Homeless cases were at their peak during the 2002-2003 outbreak, during which time 65 cases were reported.

**TB Cases in King Count by Homeless Status, 2000-2005**

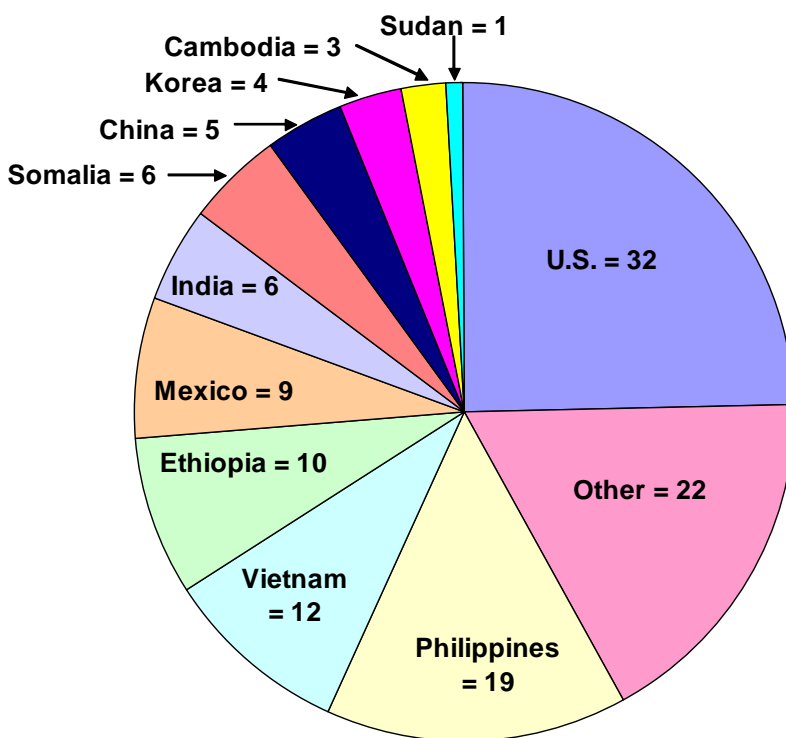


Data Source: The Tuberculosis Control Program, Public Health - Seattle & King County



- TB incidence rates per 100,000 were highest among Asians (29.3), African Americans (37.3), and American Indians (18.8), compared to non-Hispanic whites (2.3).
- About 14% of the King County TB cases had drug resistance (any drugs).
- Two cases had multi-drug resistant TB (MDR TB; resistant to at least isoniazid and rifampin), which is very difficult (20-40% mortality) and expensive (approximately \$250,000) to cure.
- Six percent of TB cases were co-infected with HIV.
- There are approximately 100 TB cases each year among foreign-born persons. The highest case numbers came from Vietnam, Ethiopia, the Philippines, Somalia, and India.
- Because of the large pool of individuals with latent TB infection (a third of the world's population is infected with TB), lack of convenient preventive medications, and lack of an effective TB vaccine, it is unlikely that TB will be eliminated anytime soon.
- The TB Control Program at Public Health – Seattle & King County focuses on (1) case management of active TB cases in order to stop further transmission of TB and prevent development of multi-drug resistant TB; (2) contact investigation around active TB cases to identify, evaluate and treat those who were exposed and recently infected and (3) partnership with community health care professionals to enhance targeted TB testing and treatment of latent TB infection.

**TB Cases among King County Residents by Country of Birth, 2005**



For more detailed information about tuberculosis, please read the 2005 Annual TB Report, to be posted shortly at <http://www.metrokc.gov/health/tb/tbfacts.htm>.

# Childhood Immunization

In the United States, children are recommended to receive vaccinations for the following diseases by their second birthday: diphtheria, tetanus, and pertussis (DTaP), measles, mumps, and rubella (MMR), *Haemophilus influenza* type b (Hib), hepatitis B, poliomyelitis, varicella (chickenpox) and pneumococcal (PCV) disease. Influenza vaccine is recommended for all children 6-23 months of age and high-risk children 24 months and older. The Washington State immunization law requires that all children be immunized with specified vaccines for childcare and at school entry. A two year old is considered current for the recommended basic immunizations if the child has had 4 DTaP, 3 polio, 1 MMR, 3 Hib, and 3 hepatitis B (HepB) vaccines (4:3:1:3:3 series), plus 1 varicella, 4 PCVs (pneumococcal conjugate vaccine), and 2 hepatitis A vaccines.

Through the Vaccines for Children Program (VFC), King County distributes 700,000 doses of childhood vaccine annually to over 300 clinic sites throughout the county. This state and federally funded program assures that low-cost immunizations are available for all children in Washington State.

- Among King County children aged 19-35 months in 2004, the percentage of children who received the 4:3:1:3:3 series was 81.0%, compared to 77.7% in Washington State and 80.9% in the U.S. These rates are lower than the U.S. 2010 target of 90%.
- Between 1999 and 2004 in King County, the child immunization rate increased significantly especially after a low of 64.7% in 2001. In March 2005, King County received two awards from the Centers for Disease Control and Prevention for this achievement, one for child immunization high coverage rates and one for the significant improvement.

**Childhood Immunization Rates in King County, WA State, and the U.S. US, National Immunization Survey, 2004 ( $\pm$  95% Confidence Interval)**

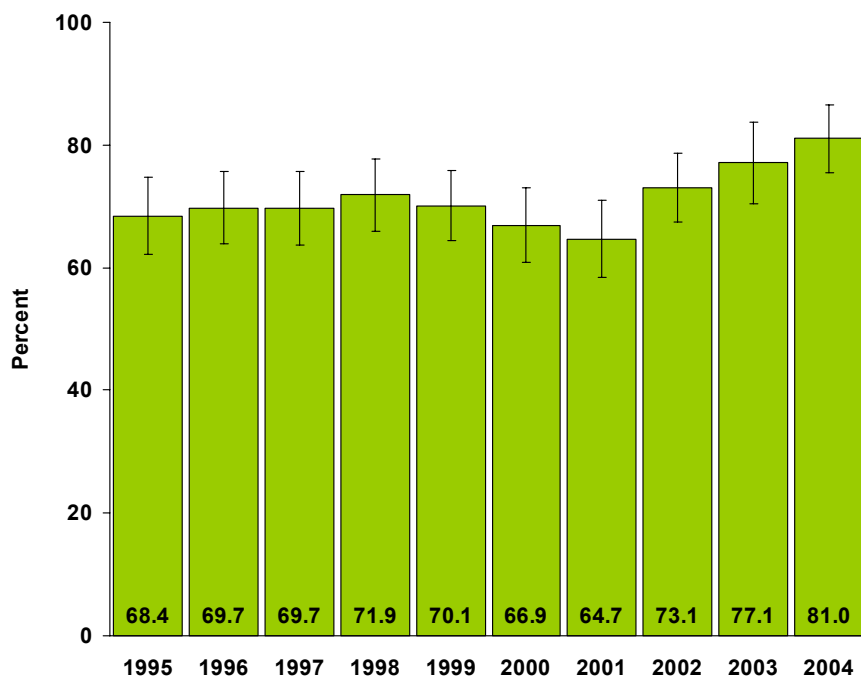
Children 19-35 Months of Age			
	King County	Washington	U.S.
<b>3+DTP</b>	96.3 $\pm$ 2.8	96.4 $\pm$ 1.9	95.9 $\pm$ 0.5
<b>4+DTP</b>	89.0 $\pm$ 4.7	85.0 $\pm$ 4.1	85.5 $\pm$ 0.8
<b>3+Polio</b>	92.4 $\pm$ 3.7	91.0 $\pm$ 3.0	91.6 $\pm$ 0.7
<b>1+MMR<sup>†</sup></b>	94.8 $\pm$ 3.0	92.3 $\pm$ 2.8	93.0 $\pm$ 0.6
<b>3+Hib</b>	95.5 $\pm$ 2.9	94.9 $\pm$ 2.2	93.5 $\pm$ 0.6
<b>3+HepB</b>	90.8 $\pm$ 3.8	88.7 $\pm$ 3.3	92.4 $\pm$ 0.6
<b>1+Var<sup>††</sup></b>	84.5 $\pm$ 4.8	77.6 $\pm$ 4.4	87.5 $\pm$ 0.7
<b>3+PCV<sup>‡</sup></b>	87.5 $\pm$ 4.9	81.0 $\pm$ 4.2	73.2 $\pm$ 1.0
<b>4:3:1</b>	85.7 $\pm$ 5.0	82.4 $\pm$ 4.3	83.5 $\pm$ 0.9
<b>4:3:1:3</b>	84.5 $\pm$ 5.2	81.2 $\pm$ 4.3	82.5 $\pm$ 0.9
<b>4:3:1:3:3</b>	81.0 $\pm$ 5.5	77.7 $\pm$ 4.6	80.9 $\pm$ 0.9
<b>4:3:1:3:3:1<sup>***</sup></b>	73.7 $\pm$ 6.1	66.5 $\pm$ 5.0	76.0 $\pm$ 1.0

<sup>††</sup> One or more doses of varicella at or after child's first birthday, unadjusted for history of varicella illness

<sup>‡</sup> Three or more doses of pneumococcal conjugate vaccine

<sup>\*\*\*</sup> Four or more doses of DTP, three or more doses of poliovirus vaccine, one or more doses of any MCV, three or more doses of Hib, three or more doses of HepB, and one or more doses of varicella

**Children 19-35 Months of Age with Completed 4:3:1:3:3 Vaccine Series (DTaP, Pol, MMR, Hib, Hep B)  
King County, 1995-2004**



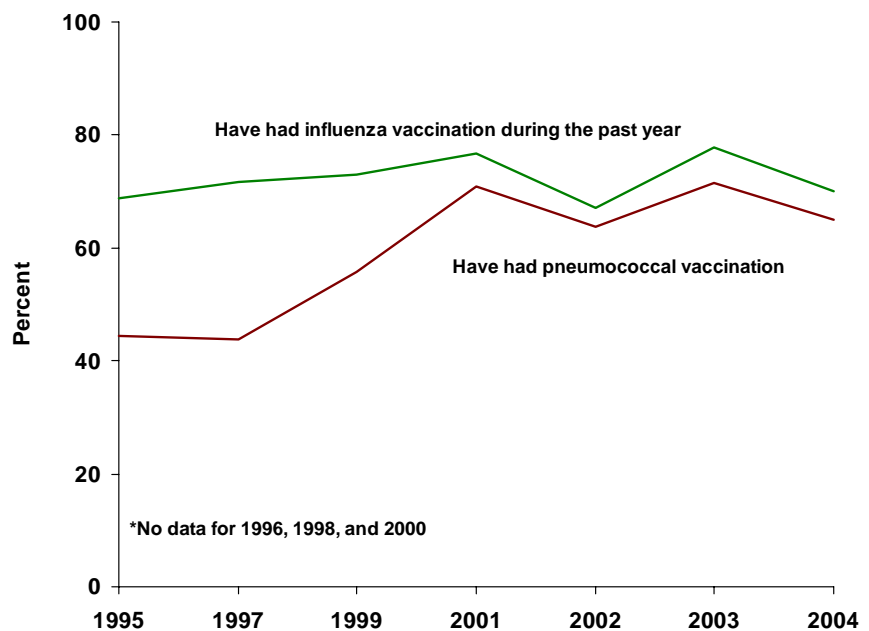
Source: National Immunization Survey, Centers for Disease Control and Prevention.  
Produced by: Public Health - Seattle & King County, Epidemiology, Planning, and Evaluation

- More parents in King County are claiming exemptions from receiving at least one immunization required for school. In the 1999-2000 school year the exemption rate was 2.9% and during the 2004-2005 school year, the exemption rate was 4.5%. Children who are not immunized may be excluded from school during a disease outbreak.

# Adult Immunization for Pneumococcal Disease and Influenza

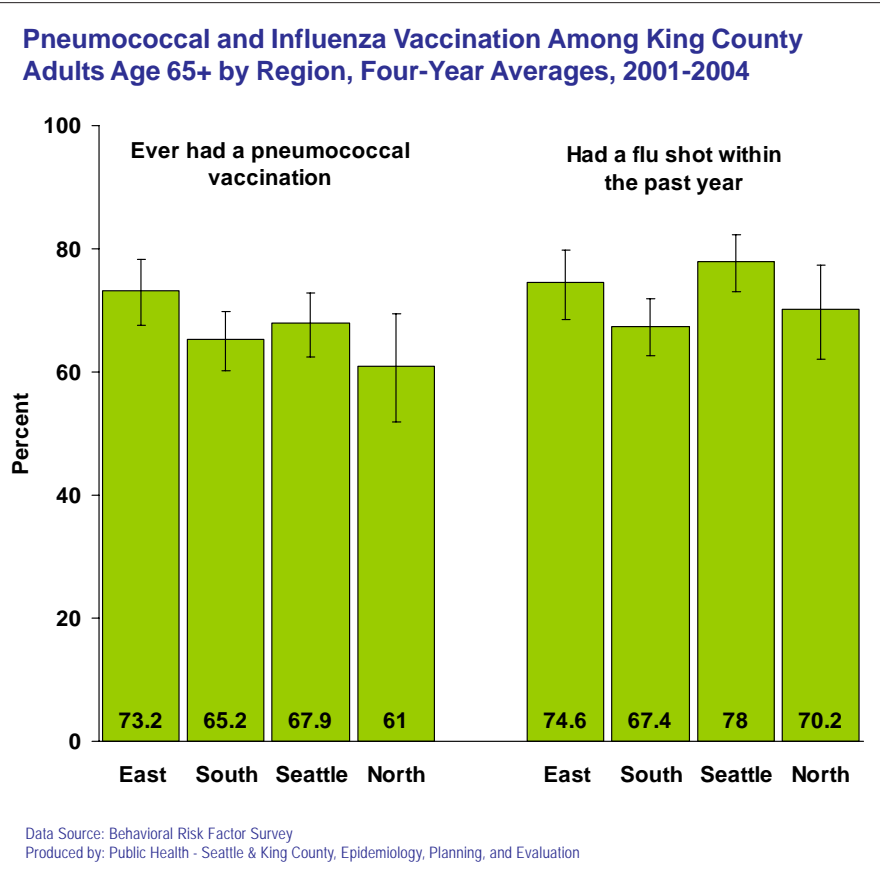
- Unlike childhood immunizations for which there are national and State programs to provide vaccine to all eligible children, there is no national adult immunization program. Consequently, among adults, access to vaccine and coverage with recommended vaccinations are lower.
- Adults age 65 and older, and those with medical conditions that increase their risk for pneumococcal disease, are recommended to receive pneumococcal vaccine.
- The primary target groups recommend for annual influenza vaccination are 1) persons at increased risk for influenza-related complications (i.e., those aged 65 years, children aged 6-23 months, pregnant women, and persons of any age with certain chronic medical conditions); 2) persons aged 50-64 because this group has an elevated prevalence of certain chronic conditions; and 3) persons who live with or care for persons at high risk.<sup>1</sup>
- In 2004, among King County adults age 65 and older, 65% have received a pneumococcal vaccine ever and 70.0% have received a flu shot during the previous year. These rates are well below the U.S. 2010 target of 90% for both types of immunization.
- Between 1995 and 2004 among King County older adults, the rate of immunization for pneumococcal disease increased significantly from 44% to 65% while there was no significant change in the rate for flu vaccine.

**Pneumococcal and Influenza Vaccination Among King County Adults Age 65+, 1995-2004\***



Source: Behavioral Risk Factor Survey  
Produced by: Public Health - Seattle & King County, Epidemiology, Planning, and Evaluation

- The increase in pneumococcal vaccination was significant in all four regions except the North region (data not shown).
- The East region had a relatively higher pneumococcal immunization rate while the South and the North regions had relatively lower rates. However, the differences among the regions were not statistically significant.
- Seattle had a relatively higher flu shot rate.



#### References

- <sup>1</sup> CDC. Prevention and Control of Influenza. Recommendations of the Advisory Committee on Immunization Practices. MMWR. Recommendations and Reports. July 29, 2005/54(RR08);1-40.

# Vaccine Preventable Diseases

## Diphtheria

- Diphtheria is an infection involving the tonsils, pharynx, larynx and nose. It is caused by the bacterium *Corynebacterium diphtheriae*. It is preventable with vaccination.
- The last case of toxigenic diphtheria was reported in Washington State in 1979.

## Haemophilus influenzae Invasive Infection

- Invasive infections with *Haemophilus influenzae* bacteria can cause meningitis, epiglottitis, pneumonia, and blood infections.
- The introduction of the *Haemophilus influenzae* type b (Hib) conjugate vaccine in 1987 led to a rapid decline in the number of pediatric invasive *H. influenzae* type b infections.
- There were two reported cases of invasive *H. influenzae* infections in 2003 and in 2004. None of the four cases were serotype b.

## Hepatitis A

- Infection with the Hepatitis A virus causes an inflammation of the liver (hepatitis) which causes fever, malaise, nausea, vomiting, abdominal pain, and jaundice (yellow eyes and skin).
- Hepatitis A is transmitted via the fecal-oral route. A person can get hepatitis A by eating food prepared by an infected person who didn't wash their hands well after using the bathroom and by eating food products contaminated with fecal material at some point during production, distribution, or preparation.
- Hepatitis A vaccine was introduced in 1995, and in October 2005, was recommended for all children age 12 months or older and adults in specific high risk groups.
- Since 1997, hepatitis A cases have been declining in King County, from 441 cases in 1997 to 14 cases in 2004.
- International travel was the most common risk factor, and was reported by half of the cases during 2003-2004.

## Hepatitis B

- Acute infection with hepatitis B virus (HBV) causes inflammation of the liver (hepatitis), with fever, malaise, nausea, vomiting, abdominal pain, and jaundice (yellow eyes and skin). Hepatitis B infection can become chronic, and lead to cirrhosis of the liver or liver cancer.
- HBV is transmitted by contact with the blood or body fluids of a person who has either an acute or chronic HBV infection. This contact may happen through occupational exposure (i.e., needle sticks in the health care setting), sexual contact, or sharing of objects contaminated with small amounts of blood such as toothbrushes, razors, or drug injection needles.
- Babies born to women who have either chronic or acute HBV infection can be exposed to the virus during the birth process. Administration of HBV immune globulin (HBIG) and HBV vaccine at birth, and follow-up doses of HBV vaccine can prevent hepatitis B infection in most infants. Babies born to women with HBV infection in King County are closely followed by Public Health to ensure that they receive HBIG at birth, appropriate follow-up doses of hepatitis B vaccine, and testing to ensure they have responded to vaccine and have not been infected.
- Reports of acute HBV cases have been declining both in King County and nationally. Between 1995 and 2004, the number of reported cases of acute HBV cases in King County declined from 85 to 23 cases.

## Measles

- Measles is an acute viral respiratory illness caused by the measles virus. Measles can cause serious complications, such as pneumonia, encephalitis, and death.
- Measles is preventable with vaccination.
- In 2004, there were six cases of measles in toddlers adopted from China. No secondary cases occurred in King County. In 2001, 12 cases of measles linked to an outbreak in Korea were reported.

## Meningococcal Disease

- A bacteria called *Neisseria meningitidis* can cause infection of the blood or meningitis, both of which are frequently life threatening. Eight to 15 percent of cases are fatal and another 10 to 20 percent result in long term complications, including mental retardation, hearing loss, and amputation of limbs.
- The disease is spread from person to person via the droplets that come out a person's mouth when they talk, cough, or sneeze. People may transmit *Neisseria meningitidis* even if they have mild or no symptoms.
- Two meningococcal vaccines are currently available which prevent infection with some strains of *Neisseria meningitidis*. Vaccination is recommended for adolescents (age 15 years or by high school entry), college freshmen living in dorms, people with asplenia (no spleen) and certain other medical conditions, laboratory personnel exposed to the bacteria, and travelers to high risk regions.
- In King County, there were 18 reported cases of meningococcal disease in 2004.
- Between 1995 and 2004, the number of reported cases per year ranged from 6 in 2003 to 31 in 1996.

## **Mumps**

- Mumps is an acute viral disease characterized by fever and swelling of the salivary (typically parotid) glands caused by infection with the mumps virus. Complications include orchitis in males and mastitis in women.
- Mumps is a vaccine preventable disease
- In 2004, one mumps case was reported in King County.

## **Pertussis (whooping cough)**

- Pertussis is a bacterial respiratory disease that causes a persistent paroxysmal cough (coughing spells or fits) often accompanied by vomiting. Some children who develop pertussis, particularly unvaccinated children, will develop a characteristic “whoop” when they inhale during a cough paroxysm.
- Pertussis infection in infants is of particular concern in infants, because of they have higher rates of hospitalization, pneumonia, and death compared to older children and adults.
- There is a pertussis vaccine which is designed to prevent severe illness and complications due to pertussis in infants. Immunity from the vaccine wears off over about 10 years leaving, even vaccinated people susceptible.
- In 2004, there were 201 reported of cases of pertussis in King County.
- A newly licensed pertussis vaccine is available for adolescents and adults and may eventually help decrease overall pertussis rates in the community.

## **Poliomyelitis**

- Poliomyelitis is a vaccine preventable disease, and through intensive vaccination campaigns, poliovirus was declared eradicated from the Western Hemisphere in 1991, from the Western Pacific in 1997, and from Europe in 1998.
- Poliomyelitis is caused by an infection with polio virus. It causes a paralytic illness in some people who are infected, however, some people infected are asymptomatic (have no symptoms), though they can pass the infection on to others.
- Because polio still occurs in other countries, travelers can be exposed to the virus, and the potential for introduction of polio into the U.S. from abroad still exists.

## **Rubella (German Measles)**

- Rubella is a rash illness caused by infection with the rubella virus.
- Rubella is usually a mild illness, however, rubella infection in a pregnant woman can cause congenital anomalies (birth defects) in the developing fetus.
- Rubella is a vaccine preventable disease.
- No cases of rubella were reported in 2003 and 2004 in King County. Two cases were reported in 2002, both in unvaccinated recent immigrants.



## Tetanus

- Tetanus is a disease that can occur with a wound becomes contaminated with a bacterium called *Clostridium tetani*. Wounds that are contaminated with dirt, saliva, or feces, puncture wounds, crush injuries, and unsterile injections are at high risk for tetanus infection, however, seemingly mild wounds can become infected as well. Tetanus is characterized by severe, potentially life-threatening muscle spasms.
- Tetanus is vaccine preventable. In the U.S., tetanus typically occurs in adults over 60 years of age, reflecting a lack of immunity in this population.
- The most recent reports of tetanus in King County occurred in 1996 (two cases) and again in 2005 (one case).

## Varicella

- Varicella (chickenpox) is not currently a legally reportable disease. Varicella is often thought of as a mild disease, but in fact, can be very serious for adolescents and adults, and both children and adults can die from complications of the disease. Due to the increase in varicella immunization rates, less varicella disease is circulating, creating a particular risk for unimmunized children who reach adolescence without being exposed to the disease. In Washington State, varicella vaccine will be required for school and child care entry beginning July 1, 2006.

## Pneumoccal Disease

- Pneumococcal disease is caused by infection with the bacterium *Streptococcus pneumoniae*. *Streptococcus pneumoniae* can cause meningitis, bloodstream infections and pneumonia children and adults
- Pneumococcal disease can be prevented by vaccination.

## Influenza

- Infection with influenza virus causes a respiratory tract infection characterized by sudden onset of high fever, muscle aches, headache, cough, and sore throat. Pneumonia is a common complication of influenza infection.
- There are two types of influenza virus that typically cause human disease. They are influenza A and B. Influenza can be prevented, or ameliorated by vaccine, but, because the viruses change each year, people who wish to avoid getting influenza must receive a vaccination every year.

## Influenza and Pneumonia Death and Hospitalization

**Influenza and pneumonia are the leading causes of death from infectious diseases in the US and King County. Like diabetes, they often occur in persons with other health problems and are often listed as a contributing cause of death rather than the underlying cause. They are also among the leading causes of hospitalization in children and the elderly.**

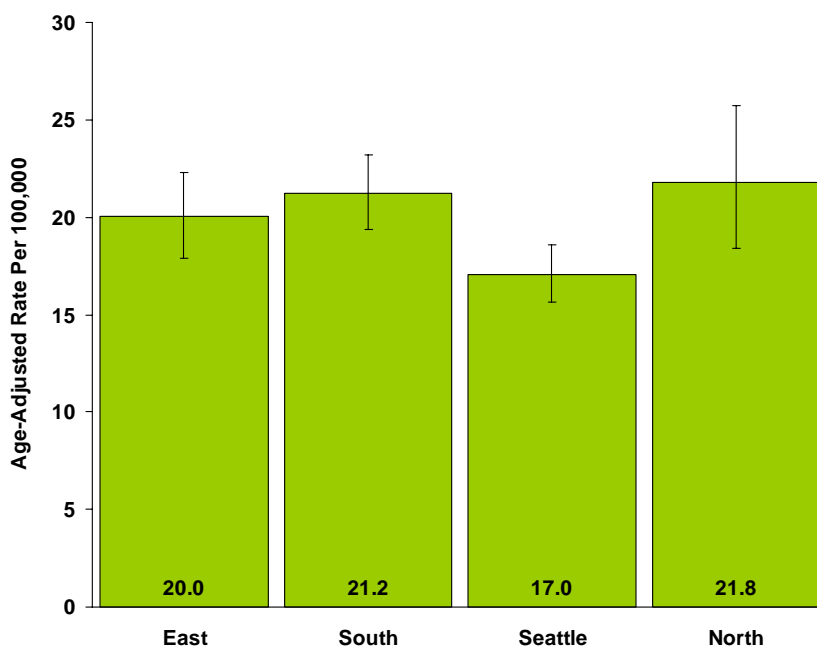
**In 2003 among King County residents, there were 334 deaths classified on death certificates as due to influenza and pneumonia. Of the 334 deaths, 296 (88.6%) were among persons age 65 and older.**

**In 2004, there were 3,596 hospitalizations for influenza and pneumonia.**

### King County and Region

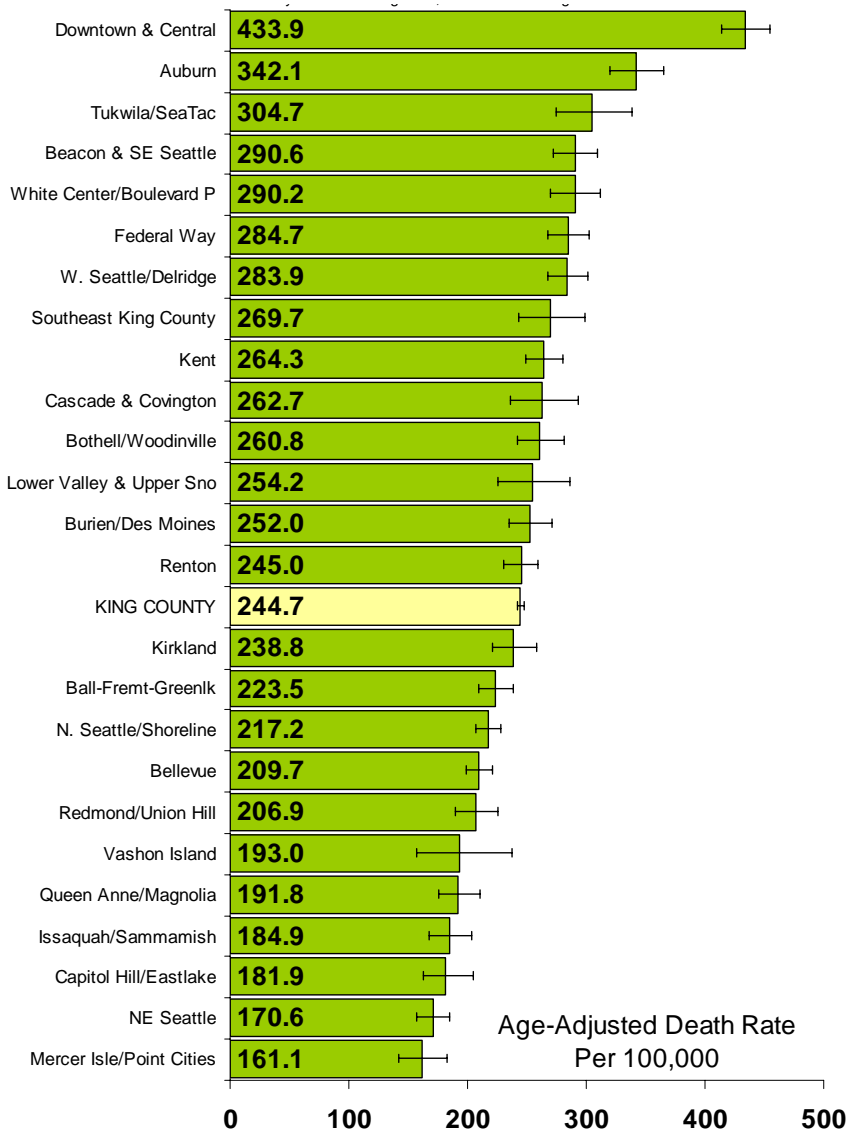
- Between 1994 and 2003, the age-adjusted influenza and pneumonia death rate declined significantly from 25.6 per 100,000 to 20.0 per 100,000.
- The decline was significant in all regions except the North region (data not shown)
- The death rate in Seattle was the lowest and was significantly lower than the King County rate.

**Influenza and Pneumonia Death Rate in King County by Region, Five-Year Averages, 1999-2003**



Source: Washington State Department of Health, Center for Health Statistics, Death Certificates  
Produced by: Public Health - Seattle & King County, Epidemiology, Planning, and Evaluation

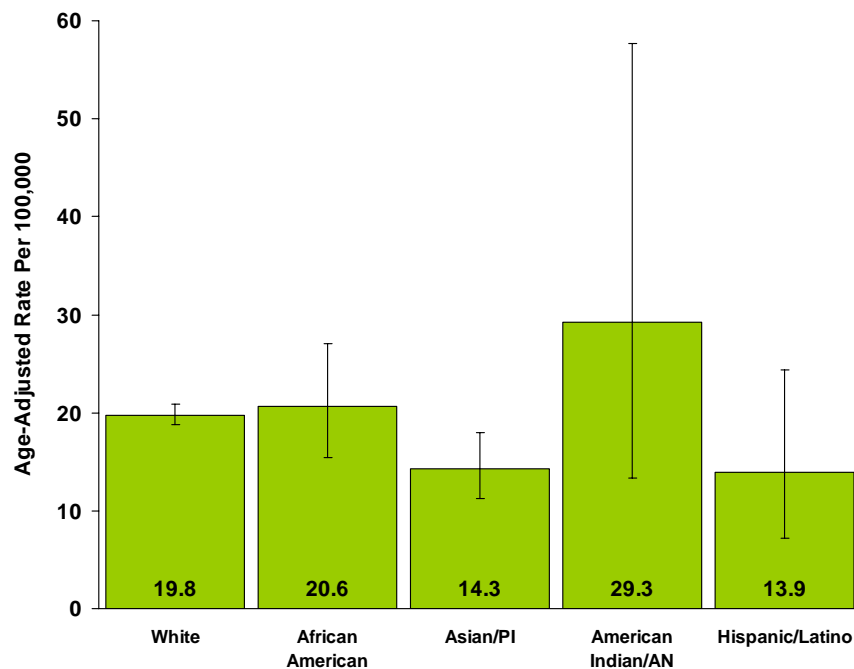
### Pneumonia/Influenza Hospitalization Rate in King County by Health Planning Area, 2000-2004 Averages



### Patterns by Health Planning Area

- Among the health planning areas, Covington/Maple Valley, Upper Snoqualmie Valley, and Issaquah/Sammamish had the highest death rate while Mercer Island/Point Cities and Ballard had the lowest death rates. However, compared to the King County average death rate, few of the areas had a significantly different rate (data not shown).
- Many hospitalizations for influenza and pneumonia may be avoidable with immunization and easy access to primary care. Among the health planning areas in King County, there are wide differences in the hospitalization rate. Averaged over 2000-2004, Downtown and Central Seattle, Auburn, and Tukwila/Sea Tac had the highest rate while Mercer Island/Point Cities, Northeast Seattle, and Capitol Hill/East Lake had the lowest rate.

**Influenza and Pneumonia Death Rate in King County  
by Race/Ethnicity, Five-Year Averages, 1999-2003**



Source: Washington State Department of Health, Center for Health Statistics, Death Certificates  
Produced by: Public Health - Seattle & King County, Epidemiology, Planning, and Evaluation

## Focus on Disparities

- Among the racial/ethnic groups in King County, only whites experienced a significant decline in the influenza and pneumonia death rate (data not shown).
- Compared to whites, American Indian/Alaska Natives had higher death rate while Asians and Hispanics had a lower rate. Nevertheless, the racial/ethnic differences were not statistically significant.

# Hepatitis C

- Hepatitis C virus (HCV) is transmitted primarily by direct exposure to the blood of an infected person. Currently, it is mostly likely transmitted through injection drug use. HCV can also be transmitted through unprotected sex and through mother to fetus during pregnancy, but this is rare.
- Over 70 percent of persons with acute HCV infection are asymptomatic. Sixty to 85 percent of persons with acute HCV infection go on to develop chronic HCV infection, and 10 to 15 percent of these people will develop cirrhosis of the liver within 20 years after infection.
- There are between 6 to 13 new cases of acute HCV infection per year.
- Chronic HCV infection became reportable in December 2000. In 2004, there were 1,285 reported cases of probable or confirmed chronic hepatitis C and another 359 cases of possible chronic hepatitis C.
- There is no vaccine for hepatitis C.

# Enteric, Food and Waterborne Diseases

## Campylobacteriosis

- Campylobacteriosis is an intestinal infection caused by *Campylobacter jejuni*. It is the most common reported bacterial cause of diarrheal illness. It is primarily transmitted through food, particularly raw or undercooked poultry, and unpasteurized milk. It can also be transmitted from person to person or from animal to person. Infected puppies and kittens, in particular, are frequent shedders of *Campylobacter*.
- Infected persons may have mild or no symptoms, but symptoms of infection include diarrhea stomach cramps, fever, nausea, and vomiting.
- In 2004, there were 264 reports of campylobacteriosis in King County.
- King County campylobacteriosis rates were not significantly different than those for the US and Washington State.

## Cryptosporidiosis

- Infection with the protozoan *Cryptosporidium parvum* (cryptosporidiosis) is primarily associated with drinking untreated surface water, contact with livestock, wild animals, and pets, and swimming in contaminated swimming pools. *Cryptosporidium* can be transmitted from person to person.
- Cryptosporidiosis infections can cause profuse and watery diarrhea, loss of appetite, and cramping and abdominal pain, however, asymptomatic infections are common.
- Boiling water for one minute kills the parasite; however, chlorination has not proven to be effective.
- *Cryptosporidium* became reportable in Washington State in 2001.
- In 2004, King County 34 cases of cryptosporidiosis were reported.

## Cyclosporiasis

- Infection with *Cyclospora cayetanensis* (cyclosporiasis) can be acquired from ingestion of water or food that was contaminated with fecal matter. It has been associated with consumption of imported berries and herbs sprayed with contaminated water. It is not spread from person to person.
- Symptoms of infection include watery diarrhea, nausea, fatigue, and weight loss. In immune compromised persons, diarrhea can last several months.
- Cyclosporiasis became a reportable condition in Washington State in 2001. Nine cases were reported in King County in 2004.

## **E. coli O157:H7 Infection**

- *E. coli* O157:H7 infections are associated with ingestion of raw or undercooked meat, unwashed contaminated produce (especially sprouts and melons), unpasteurized milk, contaminated water, and unpasteurized juices. Petting zoos can also be a source of *E. coli* O157:H7 infection when good hand washing practices are not followed after petting the animals. The bacteria can be transmitted from person to person via food, shared bath water, and contaminated objects.
- Infection with *E. coli* O157:H7 can cause severe illness. Symptoms include diarrhea, which is often bloody, and painful stomach cramps. Fever is usually mild or absent. In up to 10% of cases, infection with *E. coli* results in a serious condition called hemolytic uremic syndrome (HUS), which damages the kidneys and may cause kidney failure and death. Children under age 10 are at special risk of developing HUS.
- In 2004, there were 42 reports of *E. coli* O157:H7 in King County.
- The rate of infection with *E. coli* O157:H7 in King County was similar to rates of infection for the US and Washington State in 2004.

## **Giardiasis**

- Giardiasis is a parasitic infection caused by a protozoan, *Giardia lamblia*. The two major sources of infection in King County are ingestion of contaminated water and person to person spread among children in day care centers.
- Symptoms of infection with the *Giardia* parasite typically include stomach cramps, gas, diarrhea, lack of appetite and nausea.
- There were 126 cases of giardiasis reported in King County in 2004.
- The rate of reported giardiasis infection for King County in 2004 was similar to rates for the US and Washington State.

## **Listeriosis**

- Listeriosis is caused by a bacterium, *Listeria monocytogenes*, and is most commonly transmitted through contaminated food products. Common food sources of the bacteria include unpasteurized milk or milk products, soft cheeses (i.e., brie, Mexican-style fresh cheese), ice cream, raw vegetables, raw meats, and refrigerated meat spreads, pates, deli meats, or smoked seafood.
- Symptoms of listeriosis include fever, muscle aches, nausea, vomiting and diarrhea. Headache, stiff neck, and loss of balance or seizures can occur if meningitis or encephalitis occurs. Listeriosis can result in serious illness, including blood stream infections, meningitis, and encephalitis. People with weakened immune systems (pregnant women, persons with HIV/AIDS, the elderly, and persons with other immunosuppressive diseases) are at greatest risk of developing serious complications from infection with *Listeria* bacteria. Infections in pregnant women can cause spontaneous abortions (miscarriage), stillbirth, or severe infections (sometimes fatal) in the newborn.
- In 2004, there were 4 reports of listeriosis in King County.
- King County's listeriosis rates for 2004 were comparable to US and Washington State.

## Salmonellosis

- Salmonellosis is caused by infection with the bacterium *Salmonella*, which is primarily transmitted through ingestion of contaminated food or water. Undercooked poultry, meat, and eggs, raw unwashed produce, and unpasteurized milk are the most common vehicles of transmission. It can also be contracted from exposure to the feces of an infected person or animal. Animals that can transmit *Salmonella* bacteria to humans include reptiles (e.g. lizards, snakes, iguanas, etc), amphibians (e.g. newts, toads, salamanders, etc), and other animals (e.g. fowl, hedgehogs, etc).
- Symptoms of infection with *Salmonella* include diarrhea, stomach cramps, headache, fever, and vomiting. Up to 5% of cases can shed the bacteria for up to a year. Complications of infection are rare and include arthritis, blood stream infections, and death.
- In 2004, there were 234 reports of salmonellosis in King County.
- The rate of infection with *Salmonella* reported in King County in 2004 was comparable to rates in the US and Washington State.

## Shigellosis

- Shigellosis is an infection of the intestines caused by four different strains of *Shigella* bacteria. *Shigella* is highly infectious and the bacteria are spread easily from person to person.
- Symptoms of infection with *Shigella* include diarrhea, which is often bloody, fever, stomach cramps, nausea, and vomiting.
- In 2004, there were 63 reports of shigellosis in King County.
- King County rates of shigellosis infection did not differ from Washington State or the US in 2004.

## Yersiniosis

- Yersiniosis is caused by the bacteria, *Yersinia enterocolitica*. Yersiniosis is primarily spread through consumption of contaminated food items, especially undercooked pork or pork products. Person to person transmission is rare.
- Symptoms include diarrhea, appendicitis-like abdominal pain, and fever; however, some people infected with *Yersinia* may remain asymptomatic.
- In 2004, there were 15 cases of Yersiniosis reported in King County.

## Summary

- Food borne bacterial diseases can be prevented by cooking all meat to an internal temperature of at least 140 degrees Fahrenheit, by keeping food out of the danger zone (between 40 and 140 degrees Fahrenheit) for more than two hours, by preparing food with clean utensils, bowls and cutting boards, by preventing cross-contamination (for example, not cutting produce on a cutting board where raw meat was prepared), and by good hand washing before and after food preparation, after going to the bathroom or changing diapers, and after any contact with animals.
- Child care settings, particularly those with children in diapers are susceptible to outbreaks of intestinal diseases. Good hand washing, and sanitizing toys and diaper change areas are essential for preventing transmission.



# Vector borne and Other Zoonotic Diseases

## Hantavirus Pulmonary Syndrome (HPS)

- Hantavirus Pulmonary Syndrome is caused by infection with the Sin Nombre virus. Symptoms include fever, muscle aches, gastrointestinal symptoms, and respiratory distress.
- The first case of HPS was reported in the United States in the Southwest in 1993 among Native American populations.
- The disease is transmitted through exposure to the dried, aerosolized excreta of deer mice and other wild rodents.
- Three cases of HPS have been reported in King County with one case each in 1997, 1999, and 2003. The case reported in 1997 was fatal. All three were likely exposed in Central or Eastern Washington

## Lyme Disease

- Lyme disease is caused by the bacteria *Borrelia burgdorferi* and is often characterized by a bulls-eye shaped rash and muscle and joint aches, fever, headaches, and enlarged lymph nodes. It is transmitted to humans via the bite of infected ixodid ticks. Ticks are infected by feeding on deer. Serious neurologic and cardiac complications may result from untreated infections.
- Lyme disease is uncommon in Washington State and the Pacific Northwest.
- In 2004, there were 10 reported cases, six were persons who had traveled to the East Coast, one had traveled to the Midwest, and two traveled internationally. One case was lost to follow-up.
- No vaccine is currently licensed in the United States for Lyme disease.

# Emerging Infectious Diseases

## Pandemic Influenza <sup>1, 2</sup>

Since December 2003, outbreaks of highly pathogenic avian influenza A (H5N1) among poultry have been reported in Asia, followed by spread to Europe, the Middle East, and Africa. Cases of H5N1 influenza have been demonstrated in humans living in many areas where avian outbreaks have occurred. As of February 2, 2006, 161 cases of laboratory-confirmed influenza A (H5N1) virus infections in humans, resulting in 86 deaths, have been reported. The Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), the World Organization for Animal Health (OIE), and national health authorities in affected countries are working to assess and monitor the situation, provide epidemiologic and laboratory support, and assist with control efforts.

The rapidity and extent of spread of the avian H5N1 influenza outbreak is historically unprecedented and poses a considerable human public health risk both because the virus infects humans, causing severe disease with high mortality, and more importantly, because of the potential for the avian virus to either directly mutate or recombine with a human influenza virus and give rise to a new human pandemic strain capable of passing readily from person to person. The current H5N1 virus circulating in Asia is highly pathogenic for humans, and immunity in the human population is generally lacking. However, at this time the strain is not able to be easily transmitted between humans, and sustained person-to-person transmission has not occurred. If the virus continues to circulate widely among poultry, it has a greater potential to infect humans and other animals (such as pigs), where genetic reassortment could take place and create a new pandemic strain. Human H5N1 cases to-date have been almost exclusively associated with direct exposure to infected birds or to surfaces contaminated with excretions from infected birds.

Influenza viruses reside in wild birds in nature, and human pandemics are thought to be inevitable naturally-occurring events. During the 20<sup>th</sup> century, three human influenza pandemics occurred. The 1918-1919 pandemic was the most severe pandemic known and killed approximately 500-650,000 people in the United States and over 50 million worldwide. Nearly half of those who died were young, healthy adults. The influenza pandemics of 1957 and 1968 were less severe, resulting in 70,000 and 34,000 excess deaths in the US, respectively.

Although the severity and exact onset of the next influenza pandemic cannot be predicted, there is an unprecedented level of concern among public health officials and scientists worldwide about the potential for a human pandemic to develop from the current avian outbreak. One reason for this is that the current avian influenza A H5N1 virus resembles the 1918 virus in its genetic makeup and the severe disease it is causing.

It is estimated that depending on the level of severity, an influenza pandemic in the US could result in 865,000 – 9.9 million persons requiring hospitalization and 209,000- 1.9 million deaths with up to hundreds of billions of dollars in economic losses.

Key components of pandemic preparedness include having incident management systems for a large scale health emergency, coordination of the health and emergency response, good disease surveillance, optimally availability of vaccine and antiviral, robust healthcare system preparedness, ability to maintain essential community services, ability to implement outbreak containment measures, and timely, accurate and effective public communication.

## West Nile Virus<sup>3</sup>

- West Nile virus (WNV) is transmitted by the bite of an infected mosquito. While disease caused by WNV has been recognized in Africa, the Middle East and parts of Europe for many decades, the virus first appeared in the United States in 1999.
- Most people infected with WNV do not have any symptoms. About 20% of people who get infected develop an illness called West Nile Fever with flu-like symptoms that can range from mild to moderately severe. Less than one percent of infected people develop severe disease, called West Nile encephalitis or West Nile meningitis. The risk of severe disease or death is highest in elderly persons.
- Between January 1 and December 1, 2005, 2,744 cases of WNV disease in humans were reported in the U.S., an increase from 2,359 during the same period in 2004.
- In 2002, the virus was found for the first time in birds and horses in Washington State, but the virus has not been detected in people in Washington State as of December 2005.
- In the absence of an effective vaccine, prevention of WNV disease depends on community-level mosquito control and promotion of personal protection against mosquito bites, such as use of repellents and avoiding outdoor exposure when mosquitoes are active.

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### References

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- <sup>2</sup> WHO. Avian Influenza. [http://www.who.int/csr/disease/avian\\_influenza/en/index.html](http://www.who.int/csr/disease/avian_influenza/en/index.html)
- <sup>3</sup> CDC. West Nile Virus Activity — United States, January 1—December 1, 2005. MMWR 2005; 54(49):1253-1256. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5449a1.htm>